CLAIMS

1. Process for determining the resistivity (Rt) of a geological formation (9) surrounding a well (10) equipped with a casing (11) consisting of several casing segments (11.i, 11.s) following each other, in which two successive casing segments (11.i, 11.s) have an overlapping part (1), the cement (3) located between the casing (11) and the formation (9) and in the overlapping part (1) between two adjacent casing segments (11.i, 11.s),

in which a current is injected into the casing (11) to cause a leakage current (Ifor) into an area (8) of the formation (9) for which measurements are required, offset from the overlapping part (1), the leakage current (Ifor) in the measurement area (8) is determined and is used to deduce the measured resistivity (Rm) of the formation in the measurement area (8),

characterized in that a current is injected into the casing (11) to cause a current leakage (Icem) in the cement (3) of the overlapping part (1), the leakage current (Icem) in the cement (3) in the overlapping part (1) is determined, and is used to deduce the measured resistivity (Rcem) of the cement (3),

the measured resistivity (Rm) of the formation is corrected using a factor to take account of the measured resistivity (Rcem) of the cement (3) to obtain the resistivity (Rt) of the formation (9).

2. Process according to claim 1, characterized in that the correction factor for a given cement thickness (3) in the measurement area (8) of the formation (9) is equal to the ratio between the resistivity (Rt) and the measured resistivity (Rm) of the formation (9) as a function of the ratio between the measured resistivity (Rm) of the formation (9) and the measured resistivity (Rcem) of the cement (3).

3. Process according to either of claims 1 or 2, characterized in that the correction factor is given in nomograms starting from the measured resistivity (Rm) of the formation (9) and the measured resistivity (Rcem) of the cement (3).

4. Process according to one of claims 1 to 3, characterized in that the measured resistivity (Rm) of the formation is deduced from the leakage current (Ifor) in the measurement area (8) and the potential of the casing (11) in the measurement area (8) with respect to a reference at infinity.

5. Process according to one of claims 1 to 4, characterized in that the measured resistivity (Rcem) of the cement can be deduced from the leakage current (Icem) in the cement (3) in the overlapping part (1) and the potential in the casing (11) in the overlapping part (1) with respect to a reference at infinity.

6. Process according to one of claims 1 to 5, characterized in that the current injected into the

casing (11) to cause the leakage current (Icem) in the cement (3) in the overlapping part (1) is such that it does not cause any leakage current in the formation (9) behind the overlapping part (1).

7. Process according to one of claims 1 to 6, characterized in that the leakage current in the measurement area (8) and the leakage current in the cement (3) are determined using a probe (12) provided with measurement electrodes in contact with the casing (11), this probe (12) being moved in the well (10) to move to the measurement area (8) and to the level of the overlapping part (1), respectively.

7. Process according to claim 7, characterized in that the current is injected into the casing (11) using the probe (12) that is equipped with at least one current injector (In1, In2).

Figure 4A

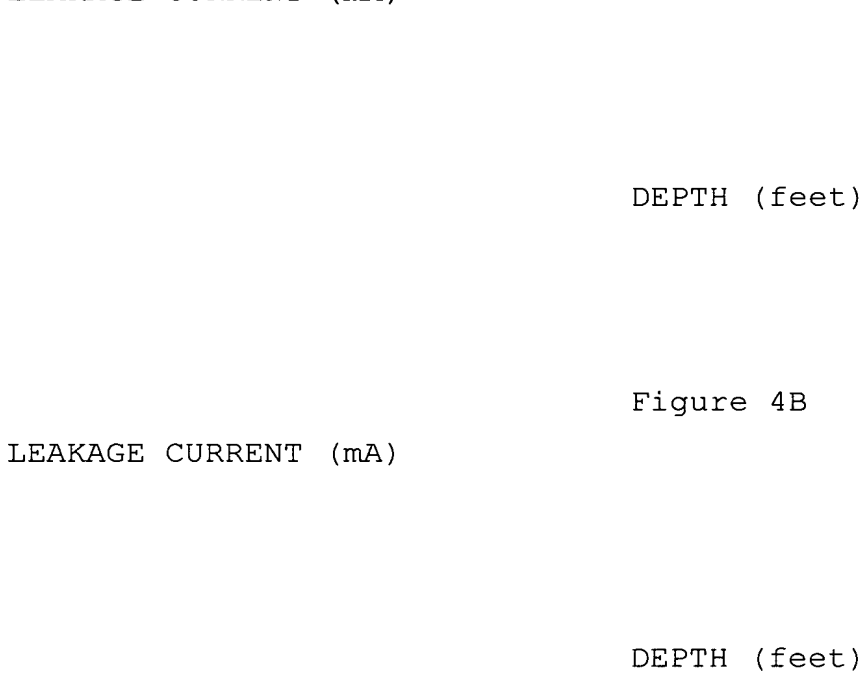

Figure 4B

Figure 4C

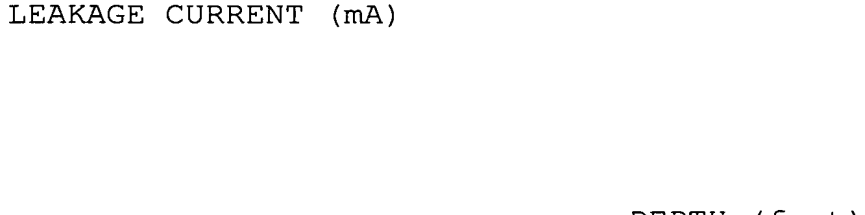

Figure 4D